



CLOSURE PLAN CONTENTS AND TECHNICAL REVIEW

3.13 - CLOSURE COST ESTIMATE

Introduction

An owner or operator of a hazardous waste treatment or storage facility must prepare detailed written estimates of the current costs for closing their facility. The cost estimates are used as a basis for determining the level of financial assurance needed. The most important reference for developing a detailed and accurate closure estimate is to have a detailed and accurate closure plan. If the steps to close a facility are clearly and methodically detailed from beginning to end in the closure plan, a clear and methodical closure cost can be calculated from each closure activity. It is essential that an accurate closure cost be developed for hazardous waste facilities and an appropriate financial assurance mechanism be put in place. In the past, facilities have been abandoned or gone out of business and left the burden of cleaning up a site to the taxpayers. With an accurate closure cost estimate and a financial assurance mechanism in place there should be funds available to close the facility in the event a facility is abandoned or goes out of business.

Submittals Required by Applicant

Major Closure Cost Estimating Requirements:

! Owners or operators of treatment and storage facilities must have a detailed written estimate in current dollars except Federal or State governmental agencies. (22 CCR 66264.142 (a))

! Owners or operators of tanks (without secondary containment) are required to prepare contingent closure and post-closure plans and must prepare closure and post-closure estimates consistent with the contingent closure plans. (22 CCR 66264.197(c))

After the permit writer has completed a detailed review of the closure cost estimate and has determined that the closure cost estimate is accurate, the closure cost estimate and the proposed financial assurance mechanism is then forwarded to the regional financial compliance officer. The financial compliance officer will then contact the facility to arrange for a financial assurance mechanism. Refer to Chapter 3.14 for specific guidance on financial assurance.

Detailed guidance regarding closure and post-closure cost estimating can be found in The following EPA publications, Background Document Final Rule Closure/Post-Closure and Financial Responsibility Requirements Hazardous Waste Treatment, Storage, and Disposal Facilities (EPA 530-SW-86-009, April 1986, "RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements" (OSWER Policy Directive #9476.00-5 January 1987), Guidance Manual: "Cost Estimates for Closure and Post-Closure Plans (Subparts G and H)" Vols. I-IV, 1987.

As a reminder, the costs given for closure activities in the guidance documents referenced above are not current. The costs may be used as a rough estimate but actual costs for each closure activity must be verified by the permit writer. Each region will have cost reference documents available in the regional technical libraries such as, the Dodge or Means cost estimating workbooks. Another source of real costs is the Site Mitigation Program, zone contract work. This information is usually itemized so the project manager can verify the work completed prior to payment. These payment records can be reviewed for actual costs. If cost references cannot be found in the library, the permit writer can obtain cost information over the phone in many cases. Contact contractors, consultants, analytical labs, treatment and/or disposal facilities, etc., in the area the work is to be performed and ask them for direct costs (ballpark costs) for a closure activity or ask them to send you current price lists for their services.

These are the basic rules to follow when preparing closure cost estimates:

! The closure cost estimate (CCE) is based directly on closure plan activities and does not include costs for corrective action.

! The CCE must equal the cost of final closure at the point in the facility's active life when the extent and manner of its operation would make closure the most expensive. The closure cost should always be high enough to ensure that if, at any time, the facility had to begin closure, the costs of closure would not exceed the cost estimate.

! If the facility expands, a revised CCE must be submitted to regulatory agencies.

! The CCE must be based on the costs to the owner or operator of hiring a third party to close the facility. A third party is a party who is neither a parent nor a subsidiary of the owner or operator.

! The closure cost estimate may not incorporate any salvage value that may be realized with the sale of hazardous wastes, or non-hazardous wastes, facility structures or equipment, land, or other assets associated with the facility at the time of partial or final closure.

! The owner or operator may use costs for onsite disposal if he can demonstrate that onsite disposal capacity will exist at all times over the life of the facility.

! If an owner or operator has a tank system that does not have secondary containment and has not been granted a variance from the secondary containment requirements, the facility must submit a contingent closure plan for the tank system.

! Unexpected crisis situations need not be included (e.g., 100 year flood, liner failure)

! The initial cost estimate is based on current costs.

Closure cost estimates are required to be updated for the following reasons:

! Annual inflation

! Changes in the facilities operation that can change the closure cost

! Increased capacity at the facility

To account for annual inflation, the owner or operator may either (1) recalculate estimates every year using that years current prices; or (2) Update the cost estimate annually by multiplying the current estimate by an inflation factor.

Major cost items for storage and treatment facility closures include:

! Removal and treatment/disposal/transportation of maximum inventories of hazardous wastes handled by the facility.

! Decontamination and/or demolition and removal of tanks, containers, and containment areas

! Disposal and/or treatment of contaminated soil (if already known and quantified)

! Removal of underground tanks

! Confirmation sampling and analysis

! Closure certification reports

Key activities to be considered while preparing closure cost estimates include:

! Inventory management (onsite versus offsite treatment/disposal)

! Facility decontamination

! Contingency factor to account for unknowns (usually 20 %)

The following is a sample problem to show the permit writer how a closure cost estimate might be prepared. It should not be used as an exact procedure for all cases but rather as a sample of what an estimate looks like.

SAMPLE CLOSURE COST ESTIMATE

I. Problem Description

All Purpose Plating (APP) has submitted a Part B application which includes a detailed closure plan and closure cost estimate for their proposed electroplating facility. The electroplating facility will operate a container storage area (CSA) and a tank farm (TF). APP must obtain a hazardous waste facility permit before they can begin operation. APP plans to operate the facility for twenty years and then clean close their container storage area and tank farm.

II. Facility Description

There was no known commercial or industrial use of the APP property prior to APP's purchase of the site. APP will generate D006 and D007 wastewaters. The CSA will be 60 feet by 40 feet. The CSA is designed with a 6" concrete pad with a leachate collection and removal system beneath the concrete pad. There will also be an 80 mil HDPE liner beneath the concrete pad. A concrete berm designed to contain 10% of the design volume plus the 24 hour storm. The container storage area is being permitted for 500-55 gallon containers. The concrete pad will be sealed with a polymer concrete sealer.

The TF will consist of three 5000 gallon tanks. The TF will be constructed on an 8" concrete pad with raised berms. Each tank has a separate raised berm area. The storage tanks will be used to store electroplating hazardous wastes. The tanks will be certified for structural integrity and chemical compatibility prior to use.

The CSA and TF will be covered by a steel roof. There will be several vats where various metal parts are dipped and transferred from one vat to another. There is a double walled pipe collection system in the process building which transfers vat spillage to a concrete sump. The liquids are returned to the process vats. The sludges are removed from the sump at least once a year. The sludges will be containerized and disposed of as hazardous wastes.

III. Closure Steps

The following activities will be followed when the facility begins closure.

1. Accept last volume of waste.
2. All solvent and electroplating drums are sent to an offsite hazardous waste Treatment Storage and Disposal Facility (TSDF) for treatment and disposal of the liquids and sludges.
3. The concrete container storage pad is demolished and sent to an offsite TSDF for disposal.

4. One foot of soil is removed from the container storage area and any discolored soil surrounding the container storage area.
5. Confirmation sampling of the storage container area is performed (a detailed sampling and analysis plan is included with the closure plan).
6. All liquids are removed from the three 5000 gallon storage tanks. The liquids are sent to an offsite TSDF for treatment and disposal.
7. All sludges are removed from the three 500 gallon storage tanks via vacuum truck and hazardous waste cleanup crew. The sludge is sent to an offsite TSDF for treatment and disposal.
8. The storage tanks are high pressure blasted for decontamination. The rinsewater is collected by vacuum truck. Each one of the storage tanks is wipe sampled. The tanks are sampled for metals and organics. Take 6 wipe samples from each tank. The collected rinsewater is sent to an offsite TSDF for treatment and disposal. Once sampling has confirmed that each storage tank has been decontaminated they will be sold.
9. The storage tank farm concrete pad will be high pressure blasted for decontamination. Take 6 wipe samples from the concrete pad for each tank cell. Sampling of containment pad and soil below is performed by coring through the concrete containment areas into the soil below. Both the concrete and soil are analyzed. The concrete pad will be left in place if the samples confirm that the concrete pad is not contaminated.
10. The concrete sump and the double walled pipe will be removed along with one foot of surrounding soil and be disposed of at an offsite TSDF.
11. An independent engineer submits a clean closure certification report.

IV. CLOSURE COST ESTIMATE USING UNIT COSTS

A. Inventory Management

1. Containerized Waste Inventory
 - a. Total number of full containers _____
 - b. Container capacity (gal/cont) _____
 - c. Containerized waste quantity (gal) _____
2. Disposal of containers
 - a. Total number of containers to be disposed of (ton) _____
 - b. Cost of disposal (\$/ton) _____
 - c. Total cost of disposal _____
3. Tank Farm Inventory
 - a. Total number of tanks _____

	b.	Tank capacity (gal)	_____
	c.	Total tank liquid waste quantity	_____
4.		Disposal of tanks	
	a.	5000 gal tanks (3 tanks) (3.3 ton/tank)	_____
	b.	Disposal cost (\$/ton)	_____
	c.	Disposal cost	\$_____
5.		Offsite Management of Inventory	
	a.	Quantity to be managed offsite (gal) Line 1c + Line 3c	_____
	b.	Offsite management unit cost (\$/gal)	_____
	c.	Offsite management total	\$_____
6.		Container and Tank Inventory Subtotal Line 2c + Line 4c + Line 5c	\$_____
B.		<u>Testing for Soil Contamination</u>	
	1.	Background and Confirmation Soil Sampling at Container Storage Area	
	a.	Number of background soil samples to be taken	_____
	b.	Number of confirmation samples to be taken	_____
	c.	Contract lab fee (\$/sample)	_____
	d.	Contract lab cost	_____
	2.	Preparation of Soil Contamination Contour	
	a.	Engineer time required (hrs)	_____
	b.	Engineer unit labor cost (\$/hr)	_____
	c.	Soil contour cost	\$_____
	3.	Soil Testing Subtotal Line 1d + Line 2c	_____
C.		<u>Decontamination of Tank Farm Pad</u>	
	1.	Pad or Foundation Decontamination	
	a.	Pad area to be decontaminated (ft ²)	_____

	b.	Pad decontamination unit cost (\$/ft ²)	_____
	c.	Pad decontamination subtotal	\$_____
2.		Testing for Success of Decontamination	
	a.	Number of samples taken	_____
	b.	Contract lab cost (\$/sample)	_____
	c.	Decontamination success cost	\$_____
3.		Offsite Management of Decontamination Fluids	
	a.	Quantity to be Managed Offsite (gal)	_____
	b.	Offsite management unit cost (\$/gal)	_____
	c.	Offsite management subtotal	_____
D.		<u>Foundation/Pad Removal</u>	
1.		Foundation/Pad Demolition	
	a.	Volume of pad to be demolished (yd ³)	_____
	b.	Demolition unit cost (\$/yd ³)	_____
	c.	Demolition cost	_____
	d.	Pad disposal unit cost (\$/yd ³)	_____
	e.	Pad disposal cost	\$_____
	f.	Pad demolition/disposal subtotal	\$_____
E.		<u>Removal of Contaminated Soil</u>	
1.		Excavation of Contaminated Soil	
	a.	Volume of contaminated soil to be removed (yd ³)	_____
	b.	Excavation unit cost (\$/yd ³)	_____
	c.	Mobilization/demobilization cost	\$_____
	d.	Contaminated soil removal subtotal	\$_____
2.		Offsite Management of Contaminated Soil	
	a.	Quantity to be disposed offsite (yd ³)	_____
	b.	Offsite disposal unit cost (incl trans)	_____

- c. Offsite disposal subtotal \$_____
3. Cost of decontamination of equipment:
- labor: (3 hr/backhoe)(2 backhoes)(\$____/hr) = \$_____
- hauling of liquids: (\$____/mile)(200 miles) = \$_____
- disposal: (\$____/ton)(1 ton/240 gallons)(600 gallons) = \$_____

CERTIFICATION OF CLOSURE

1. Independent Registered Professional Engineer

- a. Initial review of closure plan (hrs) _____
- b. Total number of inspections for closure _____
- c. Inspection time required (hrs/inspection) _____
- d. Inspection time required (hrs)
Line 1b x Line 1c _____
- e. Prepare final documentation (hrs) _____
- f. Total professional engineer time required (hrs)
Line 1a + Line 1d + Line 1e _____
- g. Professional engineer unit labor cost (\$/hr) _____
- h. Professional engineer cost (\$)
Line 1f x Line 1g _____

2. Clerical

- a. Number of weeks for closure _____
- b. Clerical time required (hrs/wk) _____
- c. Clerical unit labor cost (\$/hr) _____
- d. Clerical cost (\$)
Line 2a x Line 2b x Line 2c _____

3. Certification of Closure Subtotal (\$)

Line 1h + Line 2d _____

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List of Examples:

List of Attachments:

List of References:

List of Appendices: